

REMARKS

Examiner James Mitchell is thanked for carefully examining and reviewing the subject patent application. The claims and the specifications have been amended in accordance with the Examiner's kind suggestions, and all claims are now believed to be in condition for allowance. The language of the specifications has been amended to more accurately support claim 34. The language of independent 34 has been amendment to better represent the Applicant's claimed invention.

CLAIM REJECTIONS 35 U.S.C. 112

Reconsideration of the rejection of Claims 34-39 under 35 U.S.C. 112, first paragraph, for failing to comply with the written description is requested, based on the following. The language of the specifications has been amended to more accurately support claim 34, especially in reference to the passivation layer forming the interlocking grid array structure. Similarly, the language of independent 34 has been amendment to better represent the Applicant's claimed invention. Also, the specifications, pages 12-14, containing a summaryof the Applicant's claimed now lend support for the Applicant's claimed invention, and for passivating layer actually forming the interlocking grid array structure.

CLAIM REJECTIONS 35 U.S.C. 102

Reconsideration of the rejection of Claims 34-36 and 38 under 35 U.S.C. 102(b), as being anticipated by Shuie et al, (U.S. 5,923,088) hereafter referred to as Shiue, is requested, based on the following.

In reviewing Shiue, the Applicant's interlocking grid structures or array, in the Applicant's claimed invention contains several patentable differences from that of Shiue. The first is that the Applicant claimed structure the bonding pad barrier material is specified to be TaN, instead of TiN. The TaN barrier layer has now been specified in the Applicant's Amended Claim 34. In addition, in the Applicant's claimed invention structure, the size and shape of the interlocking grid bond pad structures are different than those found in Shiue. The Examiner's references to Shiue's teachings and matching those with Shiue's structure, seems to appear totally different than that of the Applicant's figures 1-4. For example, the reference to Shiue's Fig. 3, conductive bond pad (30) depicts a planar layer of Al and Cu.

Furthermore, there are differences in the Applicant's claimed invention that are not anticipated by, nor the same, as the Shiue disclosure. In the Applicant's claimed invention, in the specifications and in Claims 34 and 38, the claimed invention provides details of the conducting bond pad formed by the interlocking grid structure or array comprised of passivating material and copper bond pad, claim 35, or aluminum, claim 38. Applicant's claim 35 specifies a pure copper bond pad structure, with a passivating layer structure selected from SiO, SiN or polyimide.

Please note, that the Applicant's claimed invention Figures 1, 2, 3 and 4 are unique; and are not found in Shiue's Fig. 3, nor are there similarities.

In reference to the Applicant's Claim 38, the bond pad structure of Claim 34, wherein the conductive bond pad is formed of pure aluminum, please see the Applicant's claimed invention in Figs. 1, 2, 3 and 4 showing a "jagged" bond pad surface and interlocking grid structure, that is very different than Shuie's Figure 3, with planar layer (30) of Al and Cu.

CLAIM REJECTIONS 35 U.S.C. 103

Reconsideration of the rejection of Claim 37 under 35 U.S.C. 103(a), as being unpatentable over Shiue, as applied to Claim 34, is requested, in light of the following. Note, amended claim 34 now is narrowed to a barrier material of TaN.

The Shuie disclosure teaches that via plugs are formed, which are electrical contact vias, and fails to disclose or suggest an interlocking grid array, as an integral part of the bond pad structure, as claimed by the Applicant. Applicant's claimed structure is not disclosed nor suggested by Shuie's Fig. 3. The Applicant's Figures 1, 2, 3 and 4 are unique; and are not obvious. The exact dimensions of the interlocking grid for the bond pad structure are as precisely disclosed, non-obvious, as taught by the Applicant's claimed invention, in structure Claim 37.

Reconsideration of the rejection of Claim 39, under 35 U.S.C. 103(a), as being unpatentable over Yoshioka (US 5,357,136), as applied to Claim 34, in combination with Edelstein et al. (US 6,133,136), is requested, in light of the following.

Yoshioka's method patent, in combination with Edelstein's, fails to disclose nor suggest Applicant's non-obvious structure, found in the Applicant's Claim 39 and related, amended Claim 34, for conducting bond pads formed with barrier layer of TaN. Edelstein's Fig. 2 bond pad structure does not show the Applicant's claimed interlocking grid structure. Shiue's invention does not disclose TaN, and Edelstein does not disclose a barrier of TaN for a totally different bond pad structure. Finally, Yoshioka's more complicated structure Fig. 2 (e), differs from the Applicant's structure build, as shown in Figs. 1-5.

Diffusion barrier layers are common practice in the industry. Furthermore, in the Applicant's claimed invention, the key application is forming an interlocking grid array for bond pad formation

In conclusion, for state-of-the-art advanced applications in silicon bonding technology, the applicant's claimed invention is believed to be patentable over Prior Art references, Shiue, Edelstein and Yoshioka, because there seems to be insufficient basis for concluding that the modification of Prior Art disclosures, would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of these various references is desirable. We believe that there is no such basis for the combination.

Finally, in summary, the prior references fail to disclose or suggest the Applicant's non-obvious structure of an interlocking grid structure or pattern:

- (a) as shown in the Applicant's claimed invention Figs. 1 through 5;
- (b) the top surface of the grid directly interacts with the bonding metallurgy;
- (c) the interlocking grid pattern does not teach a structure of forming a conducting via, since via resistant would increase by this structure;

- (d) the Applicant's Claim 34, patentable independent claim and patentable dependent Claim 37, set forth very specific limitations;
- (e) the cited prior art sketches do not teach the Applicant's claimed invention structures.

FINAL REMARKS

The Examiner James Mitchell is again thanked for carefully examining and reviewing the subject patent application. The specifications and claims have been reviewed in accordance with all the Examiner's kind suggestions, and after amending the claims in accordance with the Examiner's helpful suggestions, all claims are now believed to be in condition for allowance.

All rejected claims 34-39 are now believed to be in allowable condition, and allowance is so requested.

It is requested that should there be any problems with this Amendment, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,



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